

REMARKS

The Examiner rejected claims 35, 58-68 and 71 under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement.

The Examiner rejected claims 33, 68 and 74 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner rejected claims 23 and 32 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson (U.S. Patent 4,747,897) in view of JP 02145335 (See also the English abstract for JP 02145335).

The Examiner rejected claims 25 and 33 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson and JP 02145335 as applied to claims 23 and 32 above, and further in view of either the admitted prior art (Specification pages 1-3 and page 8, lines 10-13) or Swci *et al.* (U.S. Patent 5,374,453).

The Examiner rejected claim 35 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson and JP 02145335 as applied to claims 23 and 32 above, and further in view of Abe *et al.* (U.S. Patent 4,495,017).

The Examiner rejected claim 58, 59, 61 and 66 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson in view of IBM ("Computer-Controlled Optical Testing of High-Density Printed-Circuit Boards").

The Examiner rejected claims 60 and 62 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson and IBM as applied to claims 58, 59, 61 and 66 above, and further in view of JP 02145335.

The Examiner rejected claim 63 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson, IBM, and JP 02145335 as applied to claims 60 and 62 above, and further in view of Sanjana *et al.* (U.S. Patent 4,590,539) and optionally Abe *et al.*

The Examiner rejected claim 64 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson and IBM as applied to claims 58, 59, 61 and 66 above, and further in view of Sanjana *et al.* and optionally either Abe *et al.* or JP 02145335 or both.

The Examiner rejected claim 65 under 35 U.S.C. §103(a) as allegedly being unpatentable

over Johnson and IBM as applied to claims 58, 59, 61 and 66 above, and further in view of Abe *et al.* and optionally JP 02145335.

The Examiner rejected claims 67 and 68 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson and IBM as applied to claims 58, 59, 61 and 66 above, and further in view of either the admitted prior art or Swei *et al.*

The Examiner rejected claims 69 and 72 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson in view of Sanjana *et al.* and optionally either Abe *et al.* or JP 02145335 or both.

The Examiner rejected claim 70 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson, Sanjana *et al.*, optionally Abe *et al.*, and optionally JP 02145335 as applied to claims 69 and 72 above, and further in view of JP 02145335.

The Examiner rejected claim 71 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson, Sanjana *et al.*, optionally Abe *et al.*, and optionally JP 02145335 as applied to claims 69 and 72 above, and further in view of Abe *et al.*

The Examiner rejected claims 73 and 74 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson, Sanjana *et al.*, optionally Abe *et al.*, and optionally JP 02145335 as applied to claims 69 and 72 above, and further in view of either the admitted prior art of Swei *et al.*

Applicants respectfully traverse the §112 and §103 rejections with the following arguments.

35 U.S.C. §112, First Paragraph

The Examiner rejected claims 35, 58-68 and 71 under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement.

The Examiner argues: "Claims 35, 65, and 71 require "solvent having a molecular weight not exceeding the molecular weight of methyl ethyl ketone". It is unclear where in the specification this limitation is disclosed, it being noted the specification does disclose the specific use of methyl ethyl ketone as the solvent (Page 9, line 23)."

In response, Applicants have amended claims 35, 65, and 71 to eliminate the phrase placing a limitation on the molecular weight of the solvent. Instead, the solvent comprising methyl ethyl ketone is claimed, which the Examiner acknowledges is supported in the specification.

The Examiner argues: "Claim 58 requires "the contrasting dye facilitates a visual contrast in the visible portion of the electromagnetic spectrum between the conductive layer and the fluoropolymer matrix". It is unclear where in the specification this limitation is disclosed, it being noted the specification does disclose the use of "contrasting pigment" as opposed to "contrasting dye". However, the specification does not disclose that either a dye or pigment is required to be visible in the visible portion of the electromagnetic spectrum, and furthermore, dyes and pigments are not required to be visible and may be transparent, i.e. not visible in the visible portion of the electromagnetic spectrum (See column 5, lines 16-19 of Kaye U.S. Patent 3,713,870 as exemplary of the use of transparent dye and/or pigment)."

In response, Applicants have amended claim 58 to delete language pertaining to the visible portion of the electromagnetic spectrum and to instead more closely track the language of the specification, page 10, lines 8-11.

Based on the preceding arguments, Applicants respectfully request that the rejection of claims 35, 58-68 and 71 under 35 U.S.C. §112, first paragraph be withdrawn.

35 U.S.C. §112, Second Paragraph

The Examiner rejected claims 33, 68 and 74 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner argues: "Claims 33, 68, and 74 ... require "liquid inorganic particles". It is unclear what is required by a liquid particle."

In response, Applicants have amended 33, 68 and 74 to clarify the invention in consistency with the specification, page 8, lines 4-9.

Based on the preceding arguments, Applicants respectfully request that the rejection of claims 33, 68, and 74 under 35 U.S.C. §112, second paragraph be withdrawn.

35 U.S.C. §103(a)

The Examiner rejected claims 23 and 32 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson (U.S. Patent 4,747,897) in view of JP 02145335 (See also the English abstract for JP 02145335).

The Examiner rejected claims 25 and 33 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson and JP 02145335 as applied to claims 23 and 32 above, and further in view of either the admitted prior art (Specification pages 1-3 and page 8, lines 10-13) or Swei *et al.* (U.S. Patent 5,374,453).

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The Examiner rejected claim 71 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson, Sanjana *et al.*, optionally Abe *et al.*, and optionally JP 02145335 as applied to claims 69 and 72 above, and further in view of Abe *et al.*

The Examiner rejected claims 73 and 74 under 35 U.S.C. §103(a) as allegedly being unpatentable over Johnson, Sanjana *et al.*, optionally Abe *et al.*, and optionally JP 02145335 as applied to claims 69 and 72 above, and further in view of either the admitted prior art of Swei *et al.*

Applicants respectfully contend that independent claims 23, 58, and 69 are not unpatentable over Johnson in view of the cited secondary references, because Johnson in view of the cited secondary references does not teach or suggest the feature: "providing a non-fibrillated fluoropolymer matrix having particles therein" (emphasis added).

Applicants next discusses the following topics to explain why the preceding feature of claims 23, 58, and 69 distinguishes Johnson in view of the cited secondary references:

1. Meaning of "Non-Fibrillated"
2. Meaning of "Non-Fibrillated Matrix"
3. Johnson Does Not Teach or Suggest A Non-Fibrillated Fluoropolymer Matrix
4. It is Not Obvious to Modify Johnson To Include A Non-Fibrillated Fluoropolymer Matrix

Meaning of "Non-Fibrillated"

While there are many issued patent which discuss "fibrillated" and "non-fibrillated" compositions, the specifications of these issued patents generally do not formally define, or clearly explain the meaning of, "fibrillated" and "non-fibrillated". Similarly, Applicants' specification clearly specifies the use of a non-fibrillated fluoropolymer but does not define "non-

fibrillated".

In order to ascertain the meaning "non-fibrillated" in the claims being examined, Applicants cite dictionary definitions, followed by a citation of an issued patent that does indeed define "non-fibrillated" and related words.

The root of fibrillated is "fibril", and "fibril" is defined in various dictionaries as follows:

- 1) "a small thread or fiber" (Webster's New Collegiate Dictionary 308 (2d ed. 1958));
- 2) "a small slender fiber, as a root hair" (The American Heritage Dictionary 500 (2d. ed 1982));

Applicants next cite, in Table 1 *infra*, United States Patent 5, 683,844 issued Nov. 4, 1997 to Mammino (hereinafter, "Mammino"), which recites as follows in Mammino, col. 6, lines 7-16:

Table 1

"The term "*fiber*" refers, for example, to any particles which exhibit geometrics and appearance characteristics which provide fibrils, tendrils, tentacles, threadlets, ligaments, hairs, bristles, whiskers, or the like structures.

The term "*fibril*" refers, for example, to a small, slender fibrous particle, with an average diameter of about 0.01 microns to about 25 microns, and an average length of about 1 micron to about 3,125 microns.

The term "*fibrillation*" refers, for example, to the forming of fibers or fibrils.

The term "*fibrillated*" refers, for example, generally to any surface having a *fiber* or fibers theron. Thus, a surface such as a coated carrier particle having a coating thereover and upon suitable abrasive treatment as illustrated herein, produces a fibrillated or fibrous carrier surface. In other embodiments, of the present invention, there can be included in the thermoplastic resin overcoating a *fibrillated fiber* material, that is, a fibrous particulate material having still other fibers, typically smaller fibers, extending from the surface of individual fibers."

Both the dictionary definitions and Mammino teaches that the scope of "fiber" includes "fibril", and that "sibril" is a species of "fiber" in which the fiber is very small (i.e., about 0.01 microns to about 25 microns in diameter). In addition, Mammino teaches that "fibrillation" refers, for example, to the forming of fibers (or fibrils since fibril is within the scope of fiber).

The next question concerns what "non-fibrillated" material is, which is what claims 23, 58, and 69 actually recite. Mammino, col. 6, lines 17-27 answers this question with the following recitation in Table 2 *infra*.

Table 2.

"Fibrillated and non-fibrillated fibers and resin materials are known in the art, reference for example, U.S. Pat. Nos. 5,405,923 which discloses suspension polymerization processes for preparing non-fibrillatable polytetrafluoroethylene particles which are irregular, fibrous, and coarse; 4,883,716 which discloses the known tendency of dispersion derived polytetrafluoroethylene to fibrillate upon intimate particle contact; 4,729,921 and 4,698,267 which disclose characterization and control of fibrillation in aramid fibers; and 4,410,586 which discloses reinforcing polymer matrices with fibers, to form films and fibrillated films."

The preceding recitation in Mammino indicates that a non-fibrillated fiber material is particulate in structure (i.e., "particles which are irregular, fibrous, and coarse"). The "fiber" in "non-fibrillated fiber material" refers to the fibrous nature of the particles and not to an actual fiber. In contrast, fibrillated material includes actual fibers as explained *supra*.

Meaning of "Non-Fibrillated Matrix"

While there are many issued patent which discuss "matrix polymers", the specifications of these issued patents generally do not formally define, or clearly explain the meaning of, "inmatrix" or "matrix polymer". Similarly, Applicants' specification clearly specifies the use of a

non-fibrillated fluoropolymer matrix but does not define "matrix".

In order to ascertain the meaning "matrix" in the context of a non-fibrillated fluoropolymer, Applicants cite, in Table 3 *infra*, United States Patent 5, 514,231 issued May. 7, 1996 to Thomas (hereinafter, "Thomas"), which recites as follows in Thomas, col. 4, lines 54-60:

Table 3.

"Thus there is produced a cylinder of *non-fibrillated* microporous PTFE, in which the **nodes** of material merge or fuse into one another to define a *matrix* of pores which, in any cylindrical surface within the material and centred about the central longitudinal axis of the cylinder, are of uniform size and are uniformly distributed in that surface and in any concentric surface."

The preceding recitation in Thomas indicates that "matrix" is identified with a distribution of nodes within the distribution of the PTFE polymer. The fact that the matrix comprises non-fibrillated PTFE implies that a non-fibrillated matrix does not include fibers as part of the matrix itself. This is consistent with the teachings of Tsai and Hahn who states that "in actual composites, fibers are completely surrounded by the matrix", indicating that the fibers exists as distinct from the matrix but yet embedded within the matrix. See Tsai, S.W. and H.T. Hahn, "Introduction to composite Materials", pages 392-393, Technomic Publishing Co., Inc. (included herewith as Appendix A).

Johnson Does Not Teach or Suggest A Non-Fibrillated Fluoropolymer Matrix

Johnson does not teach or suggest use of a non-fibrillated fluoropolymer matrix. To the contrary, Johnson teaches fluorocarbons as being comprised by fibers of a fabric that is impregnated by thermoset resins. See, e.g., Johnson, col. 4, lines 17-20.

It is also striking that the fibers of Johnson bear no resemblance to non-fibrillated material. For example, Johnson teaches that the fluorocarbon fibers are "treated" under longitudinal tension to prevent shrinking and also to facilitate impregnation by liquid

thermosetting resin. See Johnson, col. 4, lines 36-49.

It is Not Obvious to Modify Johnson To Include A Non-Fibrillated Fluoropolymer Matrix

An objective of Johnson's invention is "to provide dielectric materials having a dielectric constant below 3.5 at 1 megahertz" (see Johnson, col. 4, lines 24-25), which Johnson achieves by using fluorocarbon fibers within a thermosetting epoxy resin to achieve a composite dielectric constant of 2.6 (see Johnson, col. 4), wherein the epoxy resin by itself has a dielectric constant of 3.4 (see Johnson, col. 2, lines 1-5). Johnson explains in the Background section that it is known in the art to use a laminated composite comprised of fiberglass fabric impregnated with fluorocarbon resins, resulting in the laminated composite have a dielectric constant of approximately 2.5 at 1 megahertz (see Johnson, col. 2, lines 5-10).

However, Johnson teaches away from use of such laminated composites due to material handling problems and loss of dimensional stability (see Johnson, col. 2, lines 10-15). Johnson solves the problem with the fluorocarbon fibers in a manner that is unique to the industry. See Johnson, col. 5, lines 9-17 ("This unique process of impregnating specially treated fluorocarbon fabrics with thermosetting resin has resulted in unique products which exhibit a dielectric constant below 3.5 and retain the processing and handling advantages of thermosetting resins. It is the only known method of fabricating homogeneous, void free, multilayer printed circuit boards having a uniform dielectric constant, being always below 3.5 at 1 megahertz.").

Thus, the fluorocarbon fibers are an essential aspect of Johnson's invention, and it is accordingly not obvious to modify Johnson to incorporate fluorocarbon material through use of a non-fibrillated fluoropolymer matrix.

Based on the preceding arguments, Applicants respectfully maintain that claims 23, 58, and 69 are not unpatentable over Johnson in view of the cited secondary references, and that 23, 58, and 69 and are in condition for allowance. Since the remaining pending claims each depend from claim 23, 58, or 69, Applicants respectfully maintain that the remaining pending claims are likewise in condition for allowance.

CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invites the Examiner to contact Applicants' representative at the telephone number listed below. The Director is hereby authorized to charge and/or credit Deposit Account 09-0457.

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